

What is claimed is:

1. An optical module, comprising:

an optical semiconductor element for receiving or outputting a high frequency signal;

5 a package having a cavity in which the optical semiconductor element is placed;

an electromagnetic wave absorptive element, arranged on an inner surface of the package, for attenuating electromagnetic waves which are generated in the cavity of the package by the high frequency signal; and

10 a seal element for covering the electromagnetic wave absorptive element and hermetically sealing the electromagnetic wave absorptive element from the cavity of the package, the seal element being made of material which allows the electromagnetic waves to penetrate therethrough.

2. An optical module according to claim 1, wherein the package has a package box and a package cover which are joined to each other, and wherein the package cover is formed with the inner surface on which the electromagnetic wave absorptive element is arranged.

3. An optical module according to claim 2, wherein the package cover includes a metal layer or a metal substrate.

4. An optical module according to claim 2, wherein the package has a concavity in which the electromagnetic wave absorptive element is arranged, and wherein the concavity is covered with the seal element to hermetically seal the

electromagnetic wave absorptive element from the cavity of the package.

5. An optical module according to claim 2, wherein the package cover has a dielectric substrate, a metal layer covering an outer surface of the dielectric substrate, and a metal ring surrounding the dielectric substrate and joined to the package box.

6. An optical module according to claim 1, wherein the package has a package box, which has a bottom wall portion and a side wall portion, and a package cover which is joined to the side wall portion of the package box, and wherein the side wall portion of the package box is formed with the inner surface on which the electromagnetic wave absorptive element is arranged.

7. An optical module according to claim 1, wherein the package has a package box, which has a bottom wall portion and a side wall portion, and a package cover which is joined to the side wall portion of the package box, and wherein the bottom wall portion of the package box is formed with the inner surface on which the electromagnetic wave absorptive element is arranged.

8. An optical module according to claim 1, wherein the seal element is formed of a coating layer with which all surfaces of the electromagnetic wave absorptive element are covered, and a combination of the electromagnetic wave absorptive element and the coating layer is attached to

the inner surface of the package.

9. An optical module according to claim 8, wherein the coating layer is formed of a dielectric material.

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10. An optical module according to claim 1, wherein the electromagnetic wave absorptive element includes a conductive or magnetic material and an organic material.

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11. An optical module according to claim 1, wherein the package has a wall portion which is made of metal, and wherein the wall portion is formed with the inner surface on which the electromagnetic wave absorptive element is arranged.

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12. An optical module according to claim 1, wherein the package has a wall portion of which an outer surface is covered with a metal layer, and wherein the wall portion is formed with the inner surface on which the electromagnetic wave absorptive element is arranged.

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13. An optical module according to claim 1, wherein the seal element is made of dielectric material.

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14. An optical module according to claim 1, wherein the optical semiconductor element is formed of a laser diode.

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15. An optical module according to claim 1, wherein the optical semiconductor element is formed of an electroabsorption element.

16. An optical module according to claim 1, wherein the optical semiconductor element is formed of a photo diode.

5 17. An optical module, comprising:

an optical semiconductor element for receiving or outputting a high frequency signal;

10 a package having a cavity, in which the optical semiconductor element is placed, and a wall portion which allows electromagnetic waves to penetrate therethrough;

an electromagnetic wave absorptive element, arranged on an outer surface of the wall portion of the package, for attenuating electromagnetic waves which are generated in the cavity of the package by the high frequency signal;

15 and

a metal layer for covering an outer surface of the electromagnetic wave absorptive element.

20 18. An optical module according to claim 17, wherein the electromagnetic wave absorptive element includes a conductive or magnetic material and an organic material.

19. An optical module according to claim 17, wherein the optical semiconductor element is formed of a laser diode.

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20. An optical module according to claim 17, wherein the optical semiconductor element is formed of an electroabsorption element.

30 21. An optical module according to claim 17, wherein the

optical semiconductor element is formed of a photo diode.

22. An optical module according to claim 17, wherein the package has a package box and a package cover which are joined to each other, the package cover has a dielectric substrate equivalent to the wall portion and a metal ring which surrounds the dielectric substrate and is joined to the package box.

23. An optical module, comprising:  
an optical semiconductor element for receiving or outputting a high frequency signal;  
a circuit electrically connected to the optical semiconductor element;  
a first package having a cavity in which the optical semiconductor element is placed;  
a second package having a cavity in which the circuit and the first package are placed;  
an electromagnetic wave absorptive element, arranged on an inner surface of the second package, for attenuating electromagnetic waves which are generated in the cavity of the second package by the high frequency signal; and  
a seal element for covering the electromagnetic wave absorptive element and hermetically sealing the electromagnetic wave absorptive element from the cavity of the second package, the seal element being made of material which allows the high frequency signal to penetrate therethrough.

24. An optical module according to claim 23, further

comprising a constant temperature element, which is placed in the cavity of the second package and has the first package placed thereon, for keeping a temperature of the optical semiconductor element at a constant value through  
5 the first package.

25. An optical module, comprising:

an optical semiconductor element for receiving or outputting a high frequency signal;

10 a circuit electrically connected to the optical semiconductor element;

a first package having a cavity in which the optical semiconductor element is placed; and

15 a second package having a cavity in which the circuit and the first package are placed.

26. An optical module according to claim 25, wherein the second package has a package box and a package cover which are joined to each other, and wherein the package cover  
20 of the second package has a protrusive portion which faces the circuit.

27. An optical module according to claim 26, further comprising a constant temperature element, which is placed  
25 in the cavity of the second package and has the first package placed thereon, for keeping a temperature of the optical semiconductor element at a constant value through the first package.

30 28. An optical transmitter, comprising:

an interface unit for receiving electric signals and outputting a high frequency signal; and

an optical module for receiving the high frequency signal from the interface unit and outputting an optical signal,

5 wherein the optical module comprises:

an optical semiconductor element for receiving the high frequency signal and producing the optical signal;

a package having a cavity in which the optical element is placed;

10 an electromagnetic wave absorptive element, arranged on an inner surface of the package, for attenuating electromagnetic waves which are generated in the cavity of the package by the high frequency signal; and

15 a seal element for covering the electromagnetic wave absorptive element and hermetically sealing the electromagnetic wave absorptive element from the cavity of the package, the seal element being made of material which allows the high frequency signal to penetrate therethrough.

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29. An optical transmitter according to claim 28, wherein the interface unit comprises a multiplexer for multiplexing the electric signals to produce the high frequency signal.

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30. An optical transmitter according to claim 29, wherein the optical semiconductor element of the optical module is formed of a laser diode, and the interface unit further comprises a driver circuit for amplifying the high  
30 frequency signal produced by the multiplexer to output an

amplified high frequency signal to the laser diode.

31. An optical transmitter according to claim 29, further comprising a second optical module for receiving an electric signal and outputting a second signal, wherein the optical module is a first optical module having the optical semiconductor element formed of an electroabsorption element, and wherein the first optical module comprises a driver circuit for amplifying the high frequency signal produced by the multiplexer and outputting an amplified high frequency signal to the electroabsorption element to make the electroabsorption element convert the second optical signal output from the second optical module into the optical signal according to the amplified high frequency signal and output the optical signal.

32. An optical transmitter according to claim 31, wherein the driver circuit is placed in the cavity of the package.

33. An optical receiver, comprising:  
an optical module for receiving an optical signal and outputting a high frequency signal; and  
an interface unit for receiving the high frequency signal from the optical module and outputting electric signals, wherein the optical module comprises:  
a photo diode for receiving the optical signal and producing the high frequency signal;  
a package having a cavity in which the photo diode is placed;



an electromagnetic wave absorptive element, placed on an inner surface of the package, for attenuating electromagnetic waves which are generated in the cavity of the package by the high frequency signal; and

5 a seal element for covering the electromagnetic wave absorptive element and hermetically sealing the electromagnetic wave absorptive element from the cavity of the package, the seal element being made of material which allows the high frequency signal to penetrate  
10 therethrough.

34. An optical receiver according to claim 33, wherein the interface unit comprises a demultiplexer for demultiplexing the high frequency signal produced by the  
15 photo diode to produce electric signals.

35. An optical receiver according to claim 34, wherein the interface unit further comprises an amplifier for amplifying the high frequency signal and outputting an  
20 amplified high frequency signal to the demultiplexer to make the demultiplexer produce the electric signals from the amplified high frequency signal.